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CONGRESS OF THE UNITED STATES OFFICE OF TECHNOLOGY ASSESSMENT

November 1987

ASSESSMENT ACTIVITIES

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This booklet describes ongoing OTA projects. The form of the OTA document is given in parentheses following each title: Report (R), Special Report (SR), Technical Memorandum (TM), Background Paper (BP), Case Study (CS), and Workshop Proceedings (WP).

Full reports are provided to Members and their staff for congressional use. Others interested in the full reports can purchase them from the U.S. Government Printing Office or through the National Technical Information Service. Refer to the current OTA Publications List (OTA-P-58) or call OTA's Publications Office ((202) 224-8996) for ordering information.

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Preface

This booklet is designed to provide Members of Congress and their staffs with summaries of ongoing projects and lists some selected completed publications of interest.

The projected publication dates for ongoing work are our best current estimates but they are subject to change both to allow for uncertainties inherent in research, and because OTA must frequently shift its priorities to match evolving congressional needs.

Legislative deadlines often require OTA to release specific information from an assessment before completion of the project. Frequently this information is conveyed through a staff briefing, testimony, a special report, or a technical memorandum. If Members of Congress or congressional staff are interested in these activities, they should note that appropriate names and phone numbers are listed with each ongoing project summary.

For additional copies of this booklet or information on other OTA publications, please contact our Publications Request line (202) 224-8996.

JOHN H. GIBBONS
Director

Office of Technology Assessment (OTA)

OTA is a nonpartisan analytical support agency that serves the United States Congress by providing congressional committees with analyses of emerging, difficult, and often highly technical issues. Governed by a 12-member bipartisan, bicameral Congressional Technology Assessment Board (TAB)—six Senators and six Representatives—OTA provides a variety of services to the Senate and House on a broad range of issues. Services sometimes include briefings, testimony, and special reports on major assessments—some requiring more than 2 years to complete. OTA explores complex issues involving science and technology, helping Congress to resolve uncertainties and conflicting claims, identifying alternative policy options, and providing foresight or early alert to new developments that could have important implications for future Federal policy. OTA does not advocate particular policies or actions, but points out their pros and cons and sorts out the facts.

OTA's multidisciplinary staff plans, directs, and drafts all assessments. It draws extensively on the broad technical and professional resources of the private sector, including the academic community, public interest groups, State and local government, and the citizenry at large.

Categories of Documents Issued by OTA

OTA Reports are the principal documentation of formal assessment projects. These projects are approved in advance by the Technology Assessment Board. **Special Reports** are relatively short OTA reports on topics of direct relevance to specific legislation, oversight, or other congressional action. Both types of documents are expected to present policy options and findings with considerable policy significance. The Technology Assessment Board has the opportunity to review Reports and Special Reports before release but this does not necessarily imply endorsement of the results by the Board or its individual members.

OTA Technical Memoranda are issued at the request of committees or Members of Congress on specific technical subjects that are relevant to current congressional legislation or oversight.

OTA Background Papers, Case Studies, and Workshop Proceedings are documents that contain information that supplements formal OTA assessments or is an outcome of internal exploratory planning and evaluation. The material is usually not of immediate policy interest such as is contained in an OTA Report or Technical Memorandum, nor does it present options for Congress to consider.

Assessment Requests and Approvals

According to the Technology Assessment Act, requests for OTA assessments may be made by the chairman of any congressional committee acting for himself, or at the request of a ranking minority member or, a majority of the committee members; by the Board; or by the OTA Director in consultation with the Board.

The Board decides whether or not OTA will undertake a requested assessment. First, the OTA staff analyzes the request to determine what resources and time it might require and what modifications it might need to suit OTA's resources and congressional needs. The staff then presents a formal proposal to the Board, which makes the final decision.

Energy & Materials (228-6260)

Advanced Materials by Design (R)

Development and use of advanced materials such as high performance ceramics and polymer composites promise dramatic changes in many aspects of our economy. The unique properties and design features of these materials provide the opportunity for greatly increased performance in many products in use today, enhanced manufacturing productivity, and new types of products. Composites used as structural members in aircraft and ceramics in machine tool bits already have demonstrated some of these large performance gains. The promise of these materials has caused other nations to embark on major development programs. This Nation's ability to maintain long-term economic growth and remain competitive will depend to a large extent on how well we take advantage of the opportunities presented by these materials. To do so, however, requires that many technical problems and nontechnical barriers be overcome.

This assessment will better define the many opportunities for high-technology ceramics and polymer composites over the next 15 to 25 years. It will determine the principal technical and related problems that need to be overcome if timely expansion of the commercial use of these materials is to take place. Finally, the study will analyze the broad implications of these high-technology materials to future U.S. economic growth and competitiveness.

Project Director: Greg Eyring 228-6270.

Estimated publication date: Winter 1987-88. Interim publication: "New Structural Materials Technologies: Opportunities for the Use of Advanced Ceramics" (TM), published September 1986.

Requested by: Senate Committee on Commerce, Science, and Transportation, and its Subcommittee on Science, Technology, and Space
House Committee on Science and Technology, and its Subcommittee on Transportation, Aviation, and Materials

High-Temperature Superconductors: Research, Development, and Application (R)

The availability of high-temperature superconducting materials offers potential for many fundamentally new technological and market opportunities in computers, transportation, electric power, and other applications. Since early 1987, technical advances have been announced literally weekly and progress over the next two decades is likely to continue to be rapid on both scientific and commercial fronts.

This project will evaluate the U.S. research and development agenda for these materials, the technical and economic barriers facing potential applications, and the processing/manufacturing requirements for delivering products using these materials.

This project is being coordinated with a parallel OTA project on commercialization issues associated with application of high temperature superconductors. This parallel project, being carried out by the Industry, Technology, and Employment Program, will focus on the appropriate Federal role in commercializing these new materials and is scheduled to deliver an OTA Special Report on the subject in early 1988.

Staff Contacts: Greg Eyring 228-6270.

Estimated publication date: Spring 1989.

Requested by: Senate Committee on Energy and Natural Resources
Senate Committee on Governmental Affairs
House Committee on Science, Space, and Technology

Competitiveness of Domestic Copper (R)

Copper historically has been an important part of the domestic mineral industry and has contributed significantly to the economy, particularly in the Western United States. In recent years, however, a number of factors have combined to reduce the demand for domestic copper in favor of foreign sources of supply. The domestic costs of copper mining, smelting, and refining rose at a time when there was a surplus in international copper supplies and a decrease in demand due to materials substitution. When combined with the effects of a strong dollar and foreign industry subsidization, plus relatively low domestic ore grades, these cost increases and market conditions significantly reduced the ability of the domestic industry to compete with copper imports.

In order to identify the technical and economic issues related to the decline in competitiveness of the domestic copper industry, and to develop constructive alternatives to help revitalize the industry, OTA will: 1) assess the status of copper markets, including recent supply and demand trends and the extent to which they have been affected by substitutions; 2) identify possible future market trends, including the potential for further substitutions and/or new markets; 3) describe the technological and management state-of-the-art in copper mining, smelting, and refining (including byproduct utilization) and the cost shares for each sector; 4) assess, in the context of future market trends, advanced technologies and managerial strategies with the potential for reducing costs in each sector; and 5) identify options that could be implemented by government or private entities to revitalize the copper industry.

Project Director: Janifer Robison 228-6279.

Estimated publication date: Winter 1987-88.

Requested by: The Technology Assessment Board
Congressional Copper Caucus

Technological Risks and Opportunities for Future U.S. Energy Supply and Demand (R)

Congress is now being presented with a series of energy demand and supply forecasts that are radically different from those of just a few years ago. A common theme includes greatly moderated oil prices into the early 1990s followed by a possible return to OPEC dominance of oil markets, rising oil prices, and greatly expanded U.S. oil imports by the late 1990s. This study will evaluate current views of the U.S. future energy outlook, identify key technical uncertainties and risks that affect the validity of these views, and identify and evaluate energy policy options for dealing with these uncertainties and risks.

The first phase of the study will evaluate the implications for U.S. energy policy of volatile oil prices, emphasizing the effects of low prices on domestic oil production, e.g., plugging of stripper wells and loss of production from tertiary and some secondary recovery operations in the shorter term, loss of production and reserves due to lower drilling rates, reduced R&D expenditures, and so forth in the longer term. In the second phase, aimed at overall U.S. energy supply and demand, OTA will first examine historic changes in U.S. energy supply and demand and the ability of previous forecasts to anticipate these changes. The study will describe current forecasts for the next 15 to 25 years and identify their underlying assumptions. The study will then identify and evaluate the

primary sources of technical uncertainties in the forecasts. The sources of technical uncertainty include: economic growth rates and patterns; new energy supply, conservation, and end use technologies; geologic uncertainties about available oil and gas resources; consumer reactions to lower energy prices, and other aspects of public and industry behavior; and methodological problems in forecasting. Finally, the study will identify and evaluate policy options that would add flexibility to the energy system, i.e., to increase the system's ability to adapt to the range of futures consistent with these uncertainties.

Project Director: Steven Plotkin 228-6275.

Estimated publication date: Fall 1988. Interim publication: "U.S. Oil Production: The Effect of Low Oil Prices" (SR), published July 1987.

Requested by: House Committee on Energy and Commerce, and its Subcommittee on Fossil and Synthetic Fuels
House Committee on Government Operations

Oil Production Technologies and the Arctic National Wildlife Refuge (R)

Congress has been asked to decide the future development status of the coastal plain of the Arctic National Wildlife Refuge (ANWR), an area that combines high wilderness and wildlife values with significant prospects for the discovery of supergiant oilfields. Alternative choices for ANWR include wilderness status and opening the Refuge to full-scale oil and gas exploration and development at the extremes, and a range of intermediate strategies in between.

This study will focus on two issues affecting Congress' decision about the future of the Refuge. First, development of ANWR has been portrayed as a critical replacement for a projected rapidly declining Alaskan North Slope production. Thus, credible estmates of future Alaskan oil production are important to the congressional debate. The study will examine projections of future Alaskan oil production and evaluate the potential for shifts in future production rates with technology development and changing economic conditions and regulatory requirements. As part of this evaluation, OTA will examine the evolution of technology for Arctic onshore and offshore oil exploration, development, production, and transportation over the past 15 years, project how the state-of-the-art might evolve over the next several decades, and evaluate how technology changes might alter the production potential of North Slope oilfields.

Second, advocates and opponents of oil development have argued strenuously about the extent to which future ANWR development would resemble current North Slope development, especially regarding environmental concerns. Drawing from the examination of technology in the first part of the study, OTA will define the state-of-the-art technology that is available for use at ANWR and project potential changes in this technology that can affect both production and environmental impacts.

Project Director: Steven Plotkin 228-6275.

Estimated publication date: Spring 1988.

Requested by: Senate Committee on Energy and Natural Resources
House Committee on Merchant Marine and Fisheries

Increased Competition in the Electric Power Industry (R)

Many economists, regulators, policymakers, and others are promoting increased competition in the U.S. electric power industry as a means of improving the economic efficiency of electricity supply. In this context increased competition generally refers to expanding the choices for electricity supply available to utilities and, in some proposals, customers. The recent trend toward increased competition in the industry is typified by a number of proposals by utilities and other organizations to construct generating facilities and provide other energy supply and conservation services outside the regulatory purview of local public utility commissions, as well as by implementation of the Public Utilities Regulatory Policy Act (PURPA) of 1978. PURPA, in particular, has prompted rapid growth of nonutility cogeneration and small power generation facilities in some States.

Accompanying the trend toward increased competition are pressures on utilities to provide "wheeling" services for other utilities, retail customers, and nonutility power generators. Wheeling is a utility's provision of power transmission service for a third party, i.e., another utility or a nonutility customer. Proponents of increased competition view mechanisms for increasing access to transmission service as essential to achieving a more efficient electric power supply system. Opponents to increased transmission access argue that the present voluntary system of permitting access on a case-by-case basis has worked well and that the extreme case of mandatory transmission access could compromise system reliability as well as in effect eliminate a utility's territorial franchise without relieving it of the obligation to serve all customers in its service territory. Thus, by allowing some customers to "shop around" and purchase power from sources other than the local utility, the fixed costs of generating capacity planned and installed to serve all customers would be borne by the remaining "captive" customers.

A number of OTA assessments have focused on some of the issues associated with increased competition in the power industry. They have addressed the future of nuclear power, cogeneration, and new electric power generating technologies. The proposed assessment responds to congressional requests that OTA focus on the technological factors constraining as well as encouraging competition in the electric power industry. This assessment will focus on the wheeling issue outlined above as well as a number of other issues including the impact of dispersed generation on system operation, control, and planning. Also of concern are the associated regulatory, environmental, and economic questions.

Project Director: Alan Crane 228-6427.

Estimated publication date: Fall 1988.

Requested by: House Committee on Energy and Commerce

Selected Completed Publications *Summary available

New Electric Power Technologies: Problems and Prospects for the 1990s (R)—7/85.*
Project Director: Peter Blair 228-6278.

Nuclear Power in an Age of Uncertainty (R)—2/84.
Project Director: Alan Crane 228-6427.

Potential Effects of Section 3 of the Federal Coal Leasing Amendments Act of 1976 (SR)—3/86.
Project Director: Karen Larsen 228-6271

Starpower: The U.S. and the International Quest for Fusion Energy (R)—9/87.*
Project Director: Gerald Epstein 228-6448

Technologies for Prehistoric and Historic Preservation (R)—9/86.*
Project Director: Ray Williamson 228-6448
Follow-on publications:
"Technologies for the Preservation of Prehistoric and Historic Landscapes" (BP)—7/87.
"Technologies for Underwater Archaeology and Maritime Preservation" (BP)—9/87.

U.S. Oil Production: The Effect of Low Oil Prices (SR)—7/87.*
Project Director: Steven Plotkin 228-6275.

Western Surface Mine Permitting and Reclamation (R)—6/86.*
Project Director: Jenifer Robison 228-6279.

Industry, Technology, & Employment (228-6340)

Superfund Implementation (R)

In 1981 the Environmental Protection Agency began the Superfund program to clean up the Nation's worst hazardous waste sites. About 26,000 sites have been identified, of which 18,000 have been removed from consideration following preliminary analyses (PA) and site investigations (SI). About 6,000 sites have not yet received a PA. There may be many more sites; EPA has not systematically looked for uncontrolled hazardous waste sites. Thus, the full extent of the cleanup task facing the Nation is ill defined, and there is great uncertainty about future Federal spending. Only a handful of sites have been cleaned up according to EPA, and there is disagreement over these decisions.

The National Priorities List (NPL) now has 951 sites slated for a permanently effective cleanup. The Hazard Ranking System (HRS) used to decide whether a site is placed on the NPL has often been criticized and is being revised. Only about 40 of the NPL sites have a remedial action underway. The majority (over 500) are awaiting remedial investigations (RI) and feasibility studies (FS) and about 400 NPL sites are being studied.

This study will analyze the critical early phases of the Superfund program to address such questions as: Do current actions assure that all potential Superfund sites will be discovered and, once discovered, promptly assessed and acted upon? Are technologies available for more effective immediate actions that can reduce community concerns and improve the economic efficiency of the whole program? The HRS methodology will be examined. The technical quality of the RI and FS phases will be examined. In particular, the implications of the technical decisions in these phases for effective cleanup will be assessed.

An analytical framework will be designed to describe how the Superfund program has changed over time as a result of actions by Congress and EPA. OTA will examine if improved management and permanently effective cleanup technologies are being used to move up a learning curve over time and deliver effective environmental protection at less cost.

Project Director: Joel Hirschhorn 228-6361.

Estimated publication date: Summer 1988.

Requested by: House Committee on Public Works and Transportation
House Committee on Energy and Commerce
Senate Subcommittee on Superfund and Environmental Oversight

Endorsed by: House Subcommittee on Environment, Energy, and Natural Resources

Technology, Innovation, and U.S. Trade (R)

The international diffusion of technology has meant that competition from a growing number of countries, in a widening array of products, has cut into the market share of U.S. manufacturers. One result is an unprecedentedly large trade deficit, expected to top $160 billion in 1986. Many factors account for the edge that foreign manufacturers have won in a growing number of products. The rapid spread of technology—in many cases, technology developed in the United States—is partly a result of: 1) U.S. overseas investments and cooperative agreements, 2) the emphasis placed on the development of commercial technologies by foreign governments and businesses, and 3) the reluctance of some U.S. manufacturers to invest in new product development and commercialization. Other factors contribute to the successful penetration of U.S. markets. They include foreign industrial policies, differences in capital costs and availability, and the emphasis foreign manufacturers place on aggressive marketing and distribution, domestic manufacturing, long-term gains rather than short-term financial performance, and the effective use of human capital. High American wages, while clearly a factor, reflect our high standard of living, which few would be willing to compromise in order to compete with offshore production.

The study will examine how changes in the competitiveness of U.S. manufacturing industries affect the ability of the U.S. economy to create new jobs in various sectors. The study will also assess how technology, coupled with strategic responses by U.S. firms could reverse the erosion of our market shares. Possible policy responses of the U.S. government will be identified, with particular emphasis on policies that could stimulate U.S. producers to invest in technologies for development and commercialization of new products, policies that could aid industrial and technological development in industrializing nations without unduly harming U.S. manufacturers, and trade policies that go beyond traditional "free trade or protection" arguments.

Project Director: Julie Gorte 228-6354.

Estimated publication date: Winter 1988-89.

Requested by: Senate Committee on Finance
Senate Committee on Banking, Housing, and Urban Affairs
House Committee on Banking, Finance, and Urban Affairs

High-Temperature Superconductors: Commercialization (R)

The availability of high-temperature superconducting materials offers potential for many fundamentally new technological and market opportunities in computers, transportation, electric power, and other applications. Since early 1987, technical advances have been announced literally weekly and progress over the next two decades is likely to continue to be rapid on both scientific and commercial fronts.

Two parallel and highly coordinated efforts on high temperature superconductivity are underway at OTA, one on research and development needs for applications (Energy and Materials Program), and the other on commercialization issues (Industry, Technology, and Employment Program). The commercialization report will focus on the adequacy of Federal institutions, processes and policies to facilitate, in a manner competitive with other nations, the transition from invention to marketable product. At the request of the House Committee on Science, Space, and Technology (SST) and the Senate Committee on Governmental Affairs, this report will be delivered first, in early 1988. At that time these two Committees expect to address the question of whether the United States has appropriate programs in place for supporting commercialization of superconductivity. In parallel with the work on commercialization issues, OTA staff in the Energy and Materials Program will evaluate the U.S. research and development agenda for these materials, the technical and economic barriers facing potential applications, and the processing/manufacturing requirements for delivering products using these materials.

Staff Contact: John Alic 228-6345.

Estimated publication date: Winter 1988.

Requested by: Senate Committee on Energy and Natural Resources
Senate Committee on Governmental Affairs
House Committee on Science, Space, and Technology

Selected Completed Publications

*Summary available

Hazardous Waste Issues:

From Polution to Prevention: A Progress Report on Waste Reduction (SR)—6/87.
Serious Reduction of Hazardous Waste (R)—9/86.*
Superfund Strategy (R)—4/85.*
Technologies and Management Strategies for Hazardous Waste Control (R)—9/83.*
Project Director: Joel Hirschhorn 228-6381.

International Competition in Services: Banking, Building, Software, Know How (R)—7/87.*
Trade in Services: Exports and Foreign Revenues (SR)—9/86.*
Project Director: John Alic 228-6354.

Strategic Materials: Technologies To Reduce U.S. Import Vulnerability (R)—5/85.*
Key Contact: Audrey Buyrn 228-6348.

Technology and Structural Unemployment: Reemploying Displaced Adults (R)—2/86.*
Project Director: Julie Gorte 228-6354.
Interim publication:
"Displaced Homemakers: Programs and Policy" (SR)—10/85.

Trade Adjustment Assistance: New Ideas for An Old Program (SR)—6/87.
Project Director: Katherine Gillman 228-6353.

Plant Closing: Advance Notice and Rapid Response (SR)—9/86.
Project Director: Julie Gorte 228-6354.

International Security & Commerce (228-6420)

SDI: Technology, Survivability, and Software (R)

This project builds on the 1985 OTA report on "Ballistic Missile Defense Technology" by focusing on three major tasks. One is to update the previous report with respect to the technologies currently being researched under the Strategic Defense Initiative (SDI). The work of the earlier report will not be repeated, but rather special attention will be given to filling in gaps in that report and to reporting on technical progress made in the intervening 2 years. A second task is to examine the best currently available information on the prospects for functional survival against preemptive attack of alternative ballistic missile defense system architectures currently being studied under SDI. A third task is to analyze the issues involved in the question of whether it is feasible to develop reliable software to perform the battle management tasks required by such system architectures.

Project Director: Thomas Karas 228-6430

Estimated publication date: Winter 1987-88.

Requested by: Mandated study.

Seismic Verification of Nuclear Test Ban Treaties (R)

For nearly 30 years, a ban on the testing of nuclear weapons has been a major objective of arms control, but it has remained unattainable due in large part to the technical question of whether such a treaty could be adequately verified. This question has become particularly pronounced in view of the administration's finding that the Soviet Union is likely to have violated the Threshold Test Ban Treaty by exceeding the 150 kiloton testing limit. The specific concern is that seismic methods used to verify test bans may not be able to distinguish between earthquakes and certain relatively small nuclear explosions. In addition, the monitoring network could perhaps be evaded by muffling explosions in large underground cavities, or by masking explosions during naturally occurring earthquakes. Recently, there have been a number of technological achievements in the field of seismology and assertions have been made that they will significantly improve our capabilities to monitor underground nuclear explosions. Some of these new discoveries may also provide effective methods for countering the possible evasion ploys. This study will examine the impact that recent developments in seismology have had on the United States' capability to seismically verify a treaty with the Soviet Union that would either ban or limit the testing of nuclear weapons.

Project Director: Gregory E. vanderVink 228-6446.

Estimated publication date: Winter 1987-88.

Requested by: Senate Select Committee on Intelligence
House Committee on Foreign Affairs
House Permanent Select Committee on Intelligence

Maintaining the Defense Technology Base (R)

The security of the United States relies to a great extent on the technological superiority of our military systems over those of the Soviet Union. In recent years there has been a growing concern over the health of the defense technology base, the indispensable underpinning of this qualitative superiority. First, the speed and efficiency with which new technologies are exploited for defense purposes appears to be declining. Second, Defense Department access to high technology and high-technology products could be limited as leadership in vital areas of technology shifts to other nations due to losses in domestic and world market shares by U.S. high-technology industries. Finally, there is a downward trend in the proportion of the defense budget used to support and renew the defense technology base.

This OTA assessment will explore these concerns, assessing their validity, their causes, and options for Congress to address them. In particular, the study will: 1) explain what the defense technology base is and how it operates; 2) assess the health of the defense technology base including, to the extent necessary, the contributions made by the high-technology industries that are a major part of the defense technology base; 3) analyze the Defense Department's ability to invest selectively and efficiently in the research and development of important technology; and 4) discuss and analyze the measures that might be taken to improve the health of the technology base and DoD's ability to exploit it efficiently, including adopting research management techniques used by other entities.

Project Director: Alan Shaw 228-6443.

Estimated publication date: Winter 1987-88. Interim publication: "The Defense Technology Base: Introduction and Overview" (TM), Spring 1988.

Requested by: Senate Committee on Armed Services and its Subcommittee on Technology and Industry

Advanced Space Transportation Technologies (R)

Recent executive branch reports have identified ambitious civilian and military space goals, many of which could only be met by achieving significant advances in space transportation technology. Whether or not this nation chooses to pursue these specific goals, Congress needs credible information regarding the relationship between space goals and space launch technology and the feasibility of achieving critical technical and cost milestones.

Although some technology research will be "generic," the launch needs of NASA, the Air Force, SDI, and the U.S. private sector are not identical. If this nation chooses to invest in advanced launcher technology, it will be important to ensure that launch vehicle requirements are met without unnecessarily dissipating scarce national resources on duplicative or unproductive research.

In light of these concerns, OTA's assessment will: 1) identify launch systems capable of serving the plausible range of demand for space transportation over the next 20 years; 2) identify and evaluate key technologies—including low-cost, low-technology systems—that might increase the performance and reduce the cost of space transportation while contributing to U.S. industrial competitiveness; 3) evaluate the time and cost of development of these technologies; 4) determine how changes in spacecraft design and operations will influence launch technology; 5) analyze techniques and incentives that could reduce the operations and maintenance costs of new technologies; 6) examine alternative roles for the private sector; 7) assess the state of advanced launch research in other countries; and 8) discuss the adequacy of existing institutions for carrying out an aggressive R&D program to meet the needs of diverse users.

Project director: Richard DalBello 228-6428.

Estimated publication date: Winter 1988-89.

Requested by: House Committee on Science, Space, and Technology
Senate Committee on Commerce, Science, and Transportation

Selected Completed Publications *Summary available

Anti-Satellite Weapons, Countermeasures, and Arms Control (R)—9/85.*
Ballistic Missile Defense Technology (R)—9/85.
Project Director: Tom Karas 228-6430.

Commercial Newsgathering From Space (TM)—5/87.
Project Director: Richard DalBello 228-6428.

The Effects of Nuclear War (R)—5/79.*
Key Contact: Peter Sharfman 228-6442.

International Cooperation and Competition in Civilian Space Activities (R)—7/85.*
Project Director: Ray Williamson 228-6448.

New Technology for NATO: Implementing Follow-On Forces Attack (R)—6/87.
Project Director: Alan Shaw 228-6443.
Interim publication:
"Technologies for NATO's Follow-On Forces Attack Concept" (SR)—7/86.

Space Stations and the Law (BP)—8/86.
Project Director: Richard DalBello 228-6428.

Technology Transfer to China (R)—7/87.*
Project Director: Alan Crane 228-6427.
Interim publication:
"Energy Technology Transfer to China" (TM)—9/85.

Technology & Economic Transition—A Special Project (228-6300)

Technology and the American Economic Transition (R)

New technologies, rapid shifts in the price of energy and other critical commodities, sharp increases in trade (resulting in large part from the successful postwar reconstruction of the European and Japanese economies), and an unprecedented increase in the number of young people and women in the work force may lead to fundamental changes in the structure of the U.S. economy. We have already witnessed rapid growth in new fields (particularly those involving the processing and transmission of information) while many of the stalwarts of the American economy have not performed as well as expected. Declines in manufacturing employment have accompanied rapid growth in business service employment. Fluctuations in productivity have become increasingly difficult to explain. The analysis conducted for this project will describe how effects of technology can be disentangled from the other forces acting to change the economy. Instead of attempting to forecast the changes that may occur, it will provide a description of the choices that will be available and the potential consequences of decisions that must be made. In particular, it will examine national policy decisions that may be needed to exploit the opportunities technology can offer and protect the country from potential adverse consequences.

Project Director: Henry Kelly 226-3960.

Estimated publication date: Winter 1987-88.

Requested by: Senate Committee on Commerce, Science, and Transportation, and its Subcommittee on Business, Trade, and Tourism
Senate Committee on the Budget
House Committee on Energy and Commerce
House Committee on Post Office and Civil Service
House Committee on Science and Technology
House Committee on Education and Labor
House Committee on the Judiciary
House Committee on Public Works and Transportation
House Committee on Banking, Finance, and Urban Affairs

Selected Completed Publications

A Review of U.S. Competitiveness in Agricultural Trade (TM)—10/86.
Technology, Trade, and the U.S. Residential Construction Industry (SR)—9/86.
The U.S. Textile and Apparel Industry: A Revolution in Progress (SR)—4/87.
Project Director: Henry Kelly 228-6300.

Technology and the Future of the U.S. Construction Industry (SR)—6/86.
(Available from American Institute of Architects Press, Washington, DC.)

Biological Applications (228-6670)

Methods for Locating and Arranging Health and Long-Term Care for Persons With Dementia (R)

Growing awareness of the large number of persons affected by dementia, the difficulties involved in their care, and the lack of appropriate services for them in most communities has led to public and private efforts to establish the necessary services. Attention has focused so far on particular health and long-term care services needed by persons with dementia and their families. Less attention has been paid to methods of locating and arranging the necessary services. Some States and localities and some private agencies have established information and referral and case management systems to help families and others obtain services for persons with dementia. In some communities, local voluntary groups, usually associated with the National Alzheimer's Disease and Related Disorders Association, provide information and assistance to families in locating needed services. In most communities, however, the existing information and referral and case management services fail to meet the needs of persons with dementia and their families. As a result, families and other caregivers are referred from one agency to another in a haphazard, lengthy, and sometimes fruitless search for needed services.

This assessment will describe, compare, and evaluate existing methods of locating and arranging health and long-term care services for this patient group. It will identify methods that are successful in some communities and may therefore serve as models for other communities. It will focus on methods that coordinate services already provided by Federal, State, and local government programs and private agencies and on methods that support rather than supplant the efforts of private voluntary groups.

Project Director: Katie Maslow 228-6688.

Estimated publication date: Winter 1988-89.

Requested by: Senate Committee on Labor and Human Resources
Senate Committee on Veterans Affairs
Senate Committee on Finance
House Committee on Energy and Commerce
House Select Committee on Aging

New Developments in Biotechnology

Public attention has recently been focused on the release into the environment of genetically engineered organisms. Questions center on the stability of genetic material inserted into the organisms, on the probability that the inserted genetic material will be transferred to other, nontarget organisms, as well as on the effect of genetic material passed from one organism to another. OTA examines these issues and others in the burgeoning field of biotechnology. A series of publications will address the environmental application of genetically altered organisms; ownership of human tissues and cells; public perceptions of biotechnology; funding of research in biotechnology; and patent law applicable and appropriate to biotechnology.

Project Director: Gary Ellis 228-6681.

Completed publications:
"Ownership of Human Tissues and Cells" (SR), published March 1987; Study Director: Gladys White 228-6697
"Public Perceptions of Biotechnology" (BP), published May 1987; Study Director: Robyn Nishimi 228-6690

Publications in progress:
"U.S. Investment in Biotechnology" (SR), Winter 1987-88; Study Director: Kathi Hanna 228-6683
"Genetically Engineered Organisms in the Environment" (SR), Winter 1987-88; Study Director: Val Giddings 228-6690
"Patenting Life" (Staff Paper), Spring 1988; Study Director: Kevin O'Connor 228-6692

Requested by: House Committee on Science, Space, and Technology
House Committee on Energy and Commerce
Senate Committee on the Budget

Endorsed by: Senate Committee on Environment and Public Works, Subcommittee on Toxic Substances and Environmental Oversight

Mapping the Human Genome (R)

Each human cell, except sperm and egg cells, contains 46 chromosomes. The chromosomes contain an estimated 50,000 to 100,000 genes encoded throughout a sequence of some 3 to 3.5 billion DNA base pairs. Technologies to rapidly determine DNA sequences have been developed over the past decade, and have recently been automated. Tech-

Selected Completed Publications

*Summary available

Life-Sustaining Technologies and the Elderly (R)—7/87.*
Project Directors: Claire Maklan and Katie Maslow 228-6670.

Losing a Million Minds: Confronting the Tragedy of Alzheimer's Disease and Other Dementias (R)—4/87.*
Project Director: Robert Cook-Deegan 228-6679.

Alternatives to Animal Use in Research, Testing, and Education (R)—2/86.*
Project Director: Gary Ellis 228-6681.

Reproductive Health Hazards in the Workplace (R)—12/85.*
Key Contact: Gretchen Kolsrud 228-6686.

Technology and Aging in America (R)—6/85.*
Key Contact: Gretchen Kolsrud 228-6686.
Interim publications:
"Hearing Impairment and Elderly People" (BP)—5/86.
"Impacts of Neuroscience" (BP)—3/84.

niques to identify "landmarks" on each of the human chromosomes are well underway, and the number of such landmarks is roughly doubling each year. These emerging technologies have led to speculation that the Federal Government should mount a special effort, estimated to cost in the range of $1 billion to map human DNA and to develop new technologies to seqence and analyze DNAs of human and other organisms. A concurrent debate centers on alternative means of usefully mapping the human genome, not necessarily resulting in a complete DNA sequence. The Japanese are mounting a major project to develop automatic gene sequencing, and the Howard Hughes Medical Institute is heavily invested in gene mapping.

Policy implications arise from several sources. First, the expertise to perform the sequencing resides in several different executive agencies, primarily the Department of Energy and the National Institutes of Health. Funding and coordination would thus be complex. Second, this could be among the first "big science" projects in biology, requiring substantial resources over a sustained period. Third, the technologies to do the sequencing and gene mapping would have significant clinical applications, scientific consequences, and industrial spinoffs for biotechnology. Fourth, an international effort to map the human genome would have to contend with conflicts between free exchange of data and technology, on the one hand, and proprietary and nationalistic economic competition on the other.

Project Director: Robert Cook-Deegan 228-6679.

Estimated publication date: Winter 1987-88.

Requested by: House Committee on Energy and Commerce

Endorsed by: Senate Committee on Labor and Human Resources
House Committee on Science, Space, and Technology, Subcommittee on Natural Resources, Agriculture Research and Environment

Infertility Prevention and Treatment (R)

With infertility affecting one in ten American couples, the demand for infertility services has escalated markedly in recent years. In addition to drug therapy, microsurgery, and artificial insemination, an array of innovative reproductive technologies is now available to help infertile couples. These include in vitro fertilization, embryo transfer, embryo freezing, and gamete intra-fallopian transfer. Worldwide, an average of three babies are born each day via in vitro fertilization. OTA examines technologies to prevent, diagnose, and treat infertility; Federal and State regulation of reproductive technologies; the special reproductive problems of service veterans; and ethical considerations linked to some infertility treatments and reproductive technologies.

Project Director: Gary Ellis 228-6681.

Estimated publication date: March 1988.

Requested by: Senate Committee on Veterans' Affairs
House Committee on Government Operations, and its Subcommittee on Human Resources and Intergovernmental Relations

Institutional Protocols for Making Decisions About Life-Sustaining Treatment (SR)

Building on the findings of "Life-Sustaining Technologies and the Elderly," this study is exploring the problems and alternate solutions for implementing, within health care institutions, policies and guidelines for making decisions about the use of life-sustaining treatments. This special report will describe and analyze the development, implementation, and features of these institutional "protocols," and discuss the role of private accrediting bodies as well as Federal and State activities. It will present congressional options for stimulating/enabling/enforcing decisionmaking protocols in Federal and non-Federal health care institutions and discuss the pros and cons of each. The report will also be a useful resource document for health care institutions and professional groups that are struggling to develop policies or guidelines, and it will serve to educate individuals and groups that have not yet considered these issues.

Study Director: Claire Maklan 228-6687.

Estimated publication date: Spring 1988.

Requested by: House Select Committee on Aging
Senate Special Committee on Aging

Food & Renewable Resources (228-6533)

African Development Foundation (R)

In 1980, Congress established the African Development Foundation (ADF). Evaluations by the U.S. Agency for International Development (AID), the World Bank, and other donors had revealed persistent gaps and weaknesses in U.S. agricultural and other technical assistance and Members hoped that ADF could contribute to more successful U.S. approaches. Now, after several years of funding, ADF supports approximately 100 projects in 19 African countries, e.g., projects that improve local water supplies, provide small-scale credit, and expand vegetable and fish farming.

Although ADF's history is brief, Congress has asked a fundamental question: is the Foundation having an impact? And what can be done to improve this innovative approach to self-help development assistance? This assessment will examine ADF's funding of agriculture and renewable resource projects to: 1) assess the degree to which ADF achieves its legislated purposes to support participation of the poor in development; 2) assess the extent to which ADF efforts are sustainable and replicable; 3) examine the degree to which people's participation has led to social and economic development; and 4) identify lessons learned for ADF, AID, and other donors.

Project Director: Phyllis Windle 228-6533.

Estimated publication date: Spring 1988.

Requested by: House Committee on Foreign Affairs
House Select Committee on Hunger

Endorsed by: Senate Foreign Relations Committee, Subcommittee on African Affairs

Enhancing Low-Resource Agriculture in Africa (R)

Most people in developing countries are subsistence farmers who cannot obtain or afford the expensive fertilizers and pesticides on which high-yield (Green Revolution) technologies are based. Thus, as populations grow and fuel prices rise, low-resource agricultural technologies are receiving increased attention from donors and researchers. For example, international donors such as the Peace Corps and the World Bank are giving high priority to research and development projects that enhance rather than replace low-resource, traditional

farming methods. This is particularly true for programs in Africa where subsistence farmers hold the key to increasing food production and where the continuing need for massive food aid demonstrates the failure of many past agricultural, development assistance, and resource protection policies.

By examining low-resource agriculture worldwide, this assessment will help Congress evaluate programs and formulate policies related to both U.S. agriculture and foreign policy. In order to do this, OTA will: 1) determine which of these technologies can increase African food production in socioeconomically and environmentally sustainable ways, 2) identify the U.S. role in technology development and transfer, and 3) evaluate certain aspects of the Sahel Development Program as a case study in U.S. public and private assistance to Africa.

Project Director: Phyllis Windle 226-6533.

Estimated publication date: Winter 1987-88. Interim publication: "Continuing the Commitment: Agricultural Development in the Sahel" (SR), published August 1986.

Requested by: Technology Assessment Board
House Committee on Agriculture
House Committee on Science, Space, and Technology, Subcommittee on Natural Resources, Agricultural Research, and Environment
House Select Committee on Hunger

Technology and Public Policy To Enhance Grain Quality in International Trade (R)

U.S. agriculture is beginning to show signs of declining international competitiveness. For U.S. grains, the major component of agricultural exports, quality is becoming a growing reason for this decline. Complaints from foreign buyers have surged in recent years and congressional concern is growing about the poor quality of U.S. grain. Grain producers already are having difficult financial times and the loss of sales for quality reasons adds to their further problems.

In congressional debate of the Food Security Act of 1985, legislative proposals were discussed on how best to improve U.S. grain quality. It became quite apparent that little is known about this area, so Congress amended the Food Security Act to direct the Office of Technology Assessment to conduct a study on grain-handling technologies and export quality standards. The study is to provide information on: 1) competitive problems the United States faces in international grain markets attributed to grain quality; 2) the extent to which U.S. grain-handling technologies and quality standards have contributed to declining grain sales; 3) differences in grain-handling technology and export quality standards between the United States and competitor countries; 4) consequences to exporters and farmers to changes in grain-handling technologies and quality standards; and 5) feasibility of utilizing new technology to better classify grains.

Project Director: Mike Philips 228-6510.

Estimated publication date: Summer 1988.

Requested by: House Committee on Agriculture and its Subcommittee on Department Operations, Research, and Foreign Agriculture
Joint Economic Committee

Endorsed by: House Committee on Foreign Affairs
House Select Committee on Hunger

Technologies To Detect Pesticide Residues in Food (R)

The United States and many foreign countries rely on pesticides in producing agricultural crops. Some of these pesticides adhere to raw food products and others accumulate in the edible parts of plants. Some pesticides may be further accumulated in processed foods. In any case, residues may ultimately be harmful to the consumer's health. Thus knowing the quantity and kind of pesticides and their associated breakdown products present in various food products is fundamental to protecting U.S. consumers.

Classical analytical methods used currently by the Food and Drug Administration, the principal Federal agency that tests food for pesticide residues, can detect less than half the various pesticides that may appear on food. Development of new or improvement of existing analytical techniques would increase the government's ability to assure the safety of the food supply. Certain new biological analysis methods seem to hold potential for complementing classical methods, but none has received official validation. Similarly, computer-assisted automation of pesticide analysis holds promise (e.g., increase number of samples tested) but needs further development.

This OTA project will conduct a workshop to examine: 1) existing and emerging techniques for residue analysis of high health hazard pesticides and their breakdown products in food; 2) techniques for automating such analyses, particularly those techniques that are inexpensive; 3) methods for validation procedures; and 4) possible combinations of techniques that the government, in particular FDA, could use to improve its ability to identify and quantify pesticide residues and associated breakdown products in food.

Project Director: Susan Shen 228-6526.

Estimated publication date: Summer 1988.

Requested by: House Committee on Energy and Commerce, Subcommittee on Oversight and Investigations
House Committee on Agriculture

Endorsed by: House Committee on Agriculture, Subcommittee on Department Operations, Research, and Foreign Agriculture
Senate Committee on Agriculture

Selected Completed Publications *Summary available

Africa Tomorrow: Issues in Technology, Agriculture, and U.S. Foreign Aid (TM)—12/84.
Continuing the Commitment: Agricultural Development in the Sahel (SR)—8/86.
Project Director: Phyllis Windle 228-6533.

Integrated Renewable Resource Management for U.S. Insular Areas (R)—6/87.*
Project Director: Alison Hess 228-6516.

Technologies To Maintain Biological Diversity (R)—3/87.*
Project Director: Susan Shen 228-6526.
Interim publications:
"Grassroots Conservation of Biological Diversity in the United States" (BP)—2/86.
"Assessing Biological Diversity in the United States: Data Considerations" (BP)—3/86.

Technology, Public Policy, and the Changing Structure of American Agriculture (R)—3/86.
Project Director: Mike Phillips 228-6510.
Published: 3/86. Interim publication:
"Technology, Public Policy, and the Changing Structure of American Agriculture: A Special Report for the 1985 Farm Bill" (SR)—3/85.

Health Program (228-6590)

Federal Response to AIDS: Congressional Issues (R)

The growing impact of AIDS on the Nation's health continues unabated, despite the optimism generated by the discovery and rapid approval of the first palliative drug against the AIDS virus and preliminary testing of possible vaccines. Preventing the spread of the AIDS virus is the primary strategy that is available, but is dependent on as yet unresolved differences on when testing for infection is appropriate and on how to alter the behavior of high-risk groups. The Nation's, and even many other countries" social, economic, legal, and political systems have all been affected to some degree by the appearance of AIDS, and controversies over AIDS have even begun to affect international relations and comity among nations. Congress has responded with rapid increases in Federal funds for scientific and medical research and for research and services in preventive education, and has begun to grapple with the difficult issues involved in financing AIDS-related health care. These diverse issues warrant a different approach from the usual OTA assessment, so this project is oriented toward a monitoring and advisory capability within OTA to assist the increasing number of congressional committees that have AIDS on their agendas.

Project Director: Larry Miike 228-6590.

Estimated publication date: Indeterminate. Interim publications:
"Do Insects Transmit AIDS?" (Staff Paper), published September 1987
"Cost Effectiveness of Educational Programs to Prevent AIDS" (BP), Winter 1987-88

Requested by: Technology Assessment Board, with encouragement from the House Appropriations Committee

Healthy Children: Investing in the Future (R)

This project brings together the current evidence on the effectiveness and costs of health care technologies in promoting and maintaining children's health. It would examine current patterns of availability of these technologies and barriers to their appropriate use. The role of Federal policies, including Medicaid, Maternal and Child Health, and the Women, Infants and Children (WIC) program, in providing access to preventive and therapeutic technologies would be examined.

A range of illness prevention and therapeutic technologies is available at every phase of childhood and the prenatal period. Some, applied in the prenatal period, can reduce the risk of neonatal mortality and morbidity; others, applied later in the child's life, may prevent illnesses that typically manifest themselves in adulthood. But, new medical technology has also transformed formerly fatal childhood diseases into serious chronic illnesses, whose victims remain technology-dependent for extended periods of time. It is often feasible for these children to be cared for in the home, provided financial and supportive resources are available. The availability of these life-saving technologies raises questions about the private and public financing and organization of services for this small but growing population.

The project is emphasizing study of illness prevention technologies, including nonmedical technologies. Among the preventive technologies to be considered are prenatal screening, monitoring, and care; infant screening; immunizations; and early-childhood screening. Therapeutic technologies would include neonatal intensive care and pediatric home care for technology-dependent children.

Project Director: Judith Wagner 228-6590.

Estimated publication date: Winter 1987-88. Interim publications:
"Technology Dependent Children: Hospital v. Home Care" (TM), published May 1987;
"Neonatal Intensive Care for Low Birthweight Infants: Costs and Effectiveness" (CS), December 1987

Requested by: House Committee on Energy and Commerce
Senate Committee on Labor and Human Resources

Unorthodox Cancer Treatment (R)

In 1986, it is estimated, more than 900,000 Americans will be diagnosed with cancer, and about half of those people will die from their cancer within 5 years. Conventional cancer treatments, even when successful, can be painful and disfiguring, and of long duration. Each year, thousands of American cancer patients turn to methods of diagnosis and treatment which have not been assessed through the standard scientific process, and for which there is inadequate information on which to judge their safety and effectiveness. Many healthy people

use nontraditional methods, also unproven, which are claimed to prevent the development of cancer.

The Federal Government has not taken a direct role in evaluating or controlling most nontraditional cancer treatments, although both the Food and Drug Administration (FDA) and the National Cancer Institute (NCI) have acted in certain instances. State legislatures have passed laws legalizing the use of treatments that have not been approved by FDA. For instance, by the mid-1970s, laetrile had been legalized in more than 25 States. More recently, in 1981, Immuno-Augmentative Therapy (IAT) was made legal by the Oklahoma legislature, and the Florida legislature passed a law (repealed in 1984) allowing the use of IAT and other unconventional therapies.

In the private sector, the American Cancer Society has been most active in gathering information about nontraditional therapies and disseminating it to the public. Professional societies and patient advocacy groups have also participated in critically informing medical professionals and the public about these treatments. Proponents of unconventional treatments also have information networks through which they disseminate information.

The proposed assessment would: 1) examine the role of public and private sector bodies in evaluating and providing information about nontraditional treatments; 2) critically review the existing literature, both from mainstream science and from the proponents of nontraditional treatments; 3) estimate, if possible, the number of Americans who avail themselves of these treatments and the financial impact on individuals and on health insurers; 4) examine the potential for conducting evaluations of nontraditional treatments that would meet the same standards of evidence required of mainstream treatments; and 5) develop objective guidelines for planning such evaluations. IAT would be used as a case study for the development of guidelines.

Project Director: Helen Gelband 228-6590

Estimated publication date: Summer 1988. Interim publication: "Immuno-Augmentative Therapy" (CS), Winter 1987-88

Requested by: House Committee on Energy and Commerce

The Quality of Medical Care: Information for Consumers (R)

The general public relies on physicians and other medical providers for advice about medical technologies and referrals. But lay people still face the problem of evaluating the quality of care delivered by these providers. Public concern about this situation has grown as Federal and State governments, private insurers, and employers have increased efforts to moderate medical expenditures. There is concern that appropriate use of technologies and quality of care could be sacrificed as providers and plans in turn intensify activities to constrain their costs. More information is also important to enable the health care market to work efficiently.

This study would evaluate possible techniques for assessing quality of care to ascertain whether valid information could be developed and made available to the public. Quality and its possible measurement have multiple dimensions. Technical aspects of quality matter to medical providers, consumers, and society, but consumers may place more emphasis than providers on interpersonal aspects. At the societal level there is interest in equitable distribution of medical technologies and public health benefits of care. These dimensions of quality can be described and assessed by indicators of the structure, process, and outcome of care. The OTA study would examine available methodologies and develop criteria, such as validity, to evaluate possible quality indicators for hospitals, physicians, and health plans. In its policy options, the study would consider the availability and costliness of data, organizational responsibility for quality assessment and information dissemination, and the use of quality assessment results.

Project Director: Jane Siak 228-6590

Estimated publication date: Spring 1988

Requested by: House Committee on Energy and Commerce, Subcommittee on Health and the Environment
House Committee on Science, Space, and Technology
Senate Special Committee on Aging

Diagnostic Medical Tests: Impact on Public and Private Policies Toward Health Care (R)

Tests to identify individuals who are likely to develop serious diseases are being rapidly developed. Some of these tests are directed at genetic diseases for which there are no known therapies, thereby raising questions over the social consequences of identifying susceptible persons. Use of the test for detecting antibodies to the AIDS virus is already a highly controversial issue. The use of diagnostic tests by health insurance companies, self-insured businesses, and health maintenance organizations may lead to substantial costs to government if private insurance becomes very costly or unavailable. While the Federal Government plays an important role in financing health care, the regulation of health insurance is largely a State function. This assessment would: 1) identify the tests in use and under development, 2) identify how such tests are used in setting insurance rates for employees and their dependents or in excluding such individuals from coverage, 3) estimate the number of people who could be affected, 4) estimate the health care costs for treating or caring for affected individuals, and 5) develop policy options vis á vis the Federal role in relationship to State and private sector actions and responsibilities.

Project Director: Larry Miike 228-6590

Estimated publication date: Spring 1988

Requested by: House Committee on Energy and Commerce, Subcommittee on Health and the Environment
House Committee on Government Operations, Subcommittee on Intergovernmental Relations and Human Resources
House Committee on Science, Space, and Technology, Subcommittee on Natural Resources, Agriculture Research, and Environment
House Committee on Ways and Means

Drug Labeling in Developing Countries (R)

The U.S. pharmaceutical industry is a major supplier of pharmaceuticals to the world, including many developing countries. The industry has been criticized heavily in the past for "mislabeling" of certain drugs sold in those countries. Labeling problems can be of two types: inclusion of indications for a drug's use that are not justified by scientific studies, and failure to include adequate warnings of a drug's side effects or contraindications. Leaving aside the question of past claims, the request for this assessment asks whether such labeling is occurring today. This has been, and continues to be a contentious issue in Congress and between the pharmaceutical industry and public interest or consumer groups. Despite this attention, there has been no objective, broadly based evaluation of this issue.

The central issue is not simply one of whether there are differences in labeling between those drugs sold in developing countries and those sold in the United States (or other selected industrial nations) but whether any such differences

are significant in terms of what is known about the efficacy and safety of such drugs. The major goals of this assessment would be to evaluate (for a selected list of representative drugs) not only whether differences in labeling are occurring presently but also whether such differential labeling is appropriate in light of knowledge about the drugs. To this end, the assessment would: 1) identify possible candidate drugs whose labeling is to be evaluated; 2) collect samples of such labeling from a minimum of eight developing countries (five such countries specifically indicated and at least three at OTA's selection); and 3) evaluate the labeling of the drugs by comparing it to information from the scientific literature and any other relevant and expert sources.

Project Director: Hellen Gelband 228-6590.

Estimated publication date: Spring 1989.

Requested by: Senate Committee on Labor and Human Resources
House Committee on Energy and Commerce, Subcommittee on Health and the Environment

Monitoring of Mandated Veterans Studies

Studies of possible long-term health effects stemming from aspects of military service in Vietnam were mandated in 1979 (Public Law 96-151) and 1981 (Public Law 97-72). Both laws require the approval of study protocols and monitoring of approved studies by OTA. The Centers for Disease Control were given responsibility for designing and carrying out these studies in 1983, and, with OTA approval, have been engaged in two studies—the Vietnam Experience study and the Selected Cancers Study—since then. CDC has stated and OTA concurred that a larg-scale Agent Orange study is not feasible. OTA will continue to monitor the two ongoing studies. A recent law (Public Law 99-272) contains a mandate for a study of women Vietnam veterans, and OTA is to function similarly in regard to this study. Thus far, no protocol has been approved.

Similar responsibilities have been mandated to OTA by legislation (Public Law 98-160) related to "atomic veterans," military personnel exposed to atomic weapons testing.

Project Director: Hellen Gelband 228-6590.

Estimated publication date: Ongoing.

Requested by: Mandated studies

Prospective Payment Assessment Commission

The Prospective Payment Assessment Commission (ProPAC) is an independent advisory committee mandated under the Social Security Amendments of 1983 (Public Law 98-21) which reforms the Medicare program payment method for inpatient hospital services.

Under the statute, the OTA Director is charged with selecting the Commission members. Initial Commissioners were appointed in 1983 and each year since then the Director has made reappointments or appointed new Commissioners to fill openings created by Commissioners' terms expiring. Six Commissioners' terms expired in March of 1986, and the OTA Director made four reappointments and two new appointments. The Director appointed two new members to ProPAC in August, because the number of Commissioners was increased from 15 to 17 by the Consolidated Omnibus Budget Reconciliation Act of 1985 (Public Law 99-272).

OTA is also required to report to Congress annually on the functioning and progress of the Commission. A panel of outside experts was selected to assist in this process. The second of these reports was issued this past year.

Key Contact: Clyde Behney 228-6590

Physician Payment Review Commission

The Physician Payment Review Commission (PhysPRC) is also an independent advisory committee mandated under the Consolidated Omnibus Budget Reconciliation Act of 1985 (Public Law 99-272). PhysPRC's purpose is to advise Congress and the Executive Branch on possible ways of reforming physician payment under the Medicare program.

As with ProPAC, under the statute, the OTA Director is charged with selecting the Commission members. The initial 11 Commissioners were appointed in June 1986, to terms ranging from 1 to 3 years. In October 1986, the Director appointed two new members to the Commission in response to the Sixth Omnibus Budget Reconciliation Act (Public Law 99-509) which increased the number of Commissioners from 11 to 13. An annual report is also required on PhysPRC.

Key Contact: Clyde Behney 228-6590.

Completed Publications

*Summary available

Identifying and Regulating Carcinogens (BP)—10/87.
Key Contact: Hellen Gelband 228-6590.

Blood Policy and Technology (R)—1/85.*
Project Director: Larry Miike 228-6590.

Children's Mental Health: Problems and Services (BP)—12/86.
Project Director: Denise Dougherty 228-6590.

Federal Policies and the Medical Devices Industry (R)—12/84.*
Project Director: Jane Sisk 228-6590.
Follow-on publications:
"HCS #27: Nuclear Magnetic Resonance Imaging Technology: A Clinical, Industrial, and Policy Analysis" (CS)—9/84.
"HCS #29: Boston Elbow" (CS)—11/84.
"HCS #30: The Market for Wheelchairs: Innovation and Federal Policy" (CS)—11/84.
"HCS #31: Contact Lenses" (CS)—12/84.
"HCS #32: Hemodialysis Equipment" (CS)—12/84.
"HCS #33: Technologies for Managing Urinary Incontinence" (CS)—7/85.
"Procurement and Evaluation of Medical Devices by the Veterans Administration" (TM)—2/85.

Indian Health Care (R)—4/86.*
Project Director: Larry Miike 228-6590.

Medical Technology and the Costs of the Medicare Program (R)—7/84.*
Key Contact: Clyde Behney 228-6590.
Follow-on publications:
"HCS #22: The Effectiveness and Costs of Alcoholism Treatment" (CS)—7/83.
"HCS #23: The Safety, Efficacy, and Cost Effectiveness of Therapeutic Apheresis" (CS)—7/83.
"HCS #24: Variations in Hospital Length of Stay: Their Relationship to Health Outcomes" (CS)—8/83.
"HCS #28: Intensive Care Units (ICUs): Clinical Outcomes, Costs, and Decisionmaking" (CS)—11/84.
"HCS #34: The Cost Efffectiveness of Digital Subtraction Angiography in the Diagnosis of Cerebrovascular Disease" (CS)—5/85.
"HCS #35: Efficacy, Safety, and Cost Effectiveness of Continuous Ambulatory Peritoneal Dialysis" (CS)—9/85.

Medicare's Prospective Payment System: Strategies for Evaluating Cost, Quality, and Medical Technology (R)—10/85.*
Project Director: Judith Wagner 228-6590.

Payment for Physician Services: Strategies for Medicare (R)—2/86.*
Project Director: Jane Sisk 228-6590.
Follow-on publication:
"HCS #36: Effects of Federal Policies on Extracorporeal Shock Wave Lithotripsy" (CS)—5/86.

Status of Biomedical Research and Related Technology for Tropical Diseases (R)—9/85.*
Project Director: Hellen Gelband 228-6590.

Technologies for Detecting Heritable Mutations in Human Beings (R)—9/86.*
Key Contact: Hellen Gelband 228-6590.
Published: 9/86. Summary available.

Communication & Information Technologies (228-6760)

Technology, Public Policy, and the Changing Nature of Federal Information Dissemination (R)

The importance of public information functions of the Federal Government has been recognized since the founding of the Republic. Public information, that portion of government information that is not personal, proprietary, or classified (or otherwise subject to the Freedom of Information Act exemption), is vital to the missions of virtually every agency of the executive branch and committee of Congress, and, more broadly, to science, education, the economy, and an informed citizenry. Public information runs the gamut from reports, periodicals, directories, and handbooks; to scientific and technical information, statistical data, satellite imagery, and computer models; to maps, charts, and photographs.

Use of information technology—such as electronic document filing, computer-aided surveys, computerized databases, optical disks, electronic mail, electronic remote printing, and electronic bulletin boards—is already affecting and could ultimately revolutionize the public information functions of government. However, the use of such technology is complicated because of tensions involving public access, the sometimes conflicting roles of Federal agencies in disseminating public information, management efficiency and cost reduction, and private sector cooperation and competition.

The study will: identify and describe the current institutional base for Federal dissemination of public information (and related data collection and analysis activities); assess the current technological base and future technical developments; evaluate present and future public information needs and how technology might help meet such needs; and identify and analyze key issues and options. These will include, for example, possible future public information roles of the Government Printing Office, executive agencies, libraries, and private firms; policies for public access to Federal information, including policies on depository library and statistical information; quality of Federal information; and opportunities for innovative use of information technology in, for example, electronic remote printing of Federal reports, electronic access to Federal databases, and scientific and technical information exchange.

Project Director: Fred Wood 228-6760.

Estimated publication date: Spring 1988.

Requested by: Joint Committee on Printing
House Committee on Government Operations, and its Subcommittee on Government Information, Justice, and Agriculture

Communications Systems for an Information Age (R)

Recent advances in information storage and transmission technologies, occurring in a new deregulated and intensely competitive economic climate, are rapidly reconfiguring the Nation's communications networks. The revolution in computers and communications technology has already transformed the regulation and market structure of the industry, dramatically changing the way in which information is created, processed, transmitted, and made available to individual citizens and institutions. These technologies hold promise for a greatly enhanced communications system, which can meet the changing communications needs of an information-based society. How these technologies will evolve will depend on decisions being made now in both the public and private sectors. This study will provide a context for evaluating these decisions, and will help Congress to decide on the proper Federal role.

The assessment will explore the role the Federal Government might play in this area, with particular emphasis on the issues raised by technological advances. This study will: 1) characterize the new communication technologies and explore the intricacies of coordinating them, 2) identify their potential for meeting changing communications goals and needs, 3) discuss conflicts that might stem from their development and use, and 4) examine new communications systems abroad and their potential relationships to the U.S. system.

Project Director: Linda Garcia 228-6774

Estimated publication date: Fall 1988.

Requested by: House Committee on Energy and Commerce

Science, Technology, and the Constitution in the Information Age (R)

This project, which will be completed during the Constitutional Bicentennial Year of 1987, will examine the way in which constitutional principles have provided both stability and flexibility during two turbulent centuries of scientific advancement and technological development. By expanding our knowledge of the universe and by extending our ability to intervene in natural processes, science and technology often create new questions about how fundamental constitutional principles and precedents apply to new technological capabilities and the social changes that they stimulate or reflect.

Scientific knowledge and science-based technology increasingly play a central role in our society, as the United States begins the third century of its constitutional history in 1987. The project will examine illustrative new or emerging technologies and discuss the ways in which they may challenge traditional understanding of constitutional guarantees, or provide new possibilities for assuring the values and goals expressed in constitutional provisions.

Project Director: Vary Coates 228-6772

Estimated publication date: Winter 1987-88. Associated publications:
"Science, Technology, and the Constitution" (BP), published September 1987;
"Technology and the First Amendment" (SR);
"Technology and Constitutional Governance" (SR);
"Technology and the Bill of Rights" (SR).

Requested by: House Committee on the Judiciary.

Copyright and Audio Taping (R)

Japanese manufacturers recently introduced the digital audio tape (DAT) recorder, which represents a significant technological advance over conventional analog tape recorders; DAT makes copies of prerecorded music and copies of copies with virtually no degradation in sound quality. DAT is the latest, though by no means the last, of technological developments that allow music and other copyrighted works to be reproduced in original quality without authorization.

According to some, unauthorized duplication of copyrighted works in the home deprives copyright owners of revenue and may, in the long run, undermine the economic viability of copyright-dependent industries. These industries, as a whole, rank second in contribution to the GNP and earn a trade surplus of $1 billion per year. Although copyright is traditionally a private right privately enforced, Congress has, for the last 5 years, been attempting to formulate solutions to the perceived problem of unauthorized duplication. The latest of these efforts—concerned specifically with DAT technology—are bills (S. 503 and H.R. 1384) that would compel manufacturers of DAT machines to implant a chip in the machines that would inhibit copying of prerecorded music.

Key Contact: Fred Weingarten 228-6760.

Estimated publication date: Winter 1988-89.

Requested by: House Committee on the Judiciary and its Subcommittee on Courts, Civil Liberties, and the Administration of Justice;
Senate Committee on the Judiciary and its Sucommittee on Patents Copyrights, and Trademarks

Selected Completed Publications

*Summary available

Defending Secrets, Sharing Data: New Locks and Keys for Electronic Information (R)—10/87.*
Project Director: Charles Wilk 228-6788.

The Electronic Supervisor: New Technology, New Tensions (R)—9/87.
Project Director: Karen Bandy 228-6771.

Hospital Information Systems and the VA (SR)—10/87.
Project Director: Karen Bandy 228-6771.

Federal Government Information Technology:

Electronic Record Systems and Individual Privacy (R)—6/76.
Electronic Surveillance and Civil Liberties (R)—10/85.
Management, Security, and Congressional Oversight (R)—2/86.
Project Director: Fred Wood 228-6760.
The Social Security Administration and Information Technology (SR)—9/86
Project Director: Vary Coates 228-6772.

Information Technology Research and Development: Critical Trends and Issues (R)—2/86.*
Key contact: Fred Weingarten 228-6760.

Microelectronics Research and Development (BP)—3/86.
Key Contact: Fred Weingarten 228-6760.

Scientific Use of Supercomputers (BP)—3/86.
Project Director: Prue Adler 228-6760.

Intellectual Property Rights in an Age of Electronics and Information (R)—4/86.*
Project Director: Linda Garcia 228-6774.

Oceans & Environment (228-6840)

New Clean Air Act Issues (R)

This OTA assessment will focus on air pollution concerns that are among the most contentious issues facing Congress in its attempt to reauthorize the Clean Air Act. The first is urban ozone. Currently the health-based air quality standard for ozone is being exceeded in about 70 urban regions, areas in which about one-third of the population of the United States lives. EPA estimates that about half of the areas will still not be in attainment by the 1987 deadline required by the Act. Second, the assessment will address the closely related problem of regional oxidants (primarily ozone), pollutants that can lower the productivity of agricultural and forested regions and contribute to violations of health-based ambient air quality standards in urban areas, often far from the sources from which the pollutants are formed. Next, while evaluating the cost-effectiveness of controlling various sources of hydrocarbon emissions for lowering ozone levels, the assessment will also identify which of these hydrocarbons might also be toxic air pollutants. Finally, the assessment will update OTA's ability to analyze new options for controlling acid rain, the major focus of an earlier assessment.

Project Director: Bob Friedman 228-6855.

Estimated publication date: Spring 1988.

Requested by: Senate Committee on Environment and Public Works
House Committee on Energy and Commerce, and its Subcommittee on Health and the Environment

Book Preservation Technologies (R)

This assessment will review the appropriateness of technology selected by the Library of Congress to halt the acid deterioration of books. Acid deterioration makes books published since 1850 unusable over time. Already, millions of books in the Library of Congress' collection are too brittle to circulate. Since the mid-1970s, the Library has been working to develop the Diethyl Zinc (DEZ) Mass Deacidification process to protect the books in its collection. A pilot plant is currently being designed and tests are scheduled to begin in the fall of 1987. However, concerns have been raised about the technological effectiveness, safety, toxicology, environmental impact, and cost effectiveness of the process. Alternative methods are being used or developed by a few other libraries around the world, though not at the scale planned by the Library of Congress.

Project Director: Peter Johnson 228-6862.

Estimated publication date: Winter 1987-88.

Requested by: House Committee on Appropriations

Municipal Solid Waste Managemet (R)

Early in 1987, a barge loaded with garbage went on a long odyssey in search of a home for its cargo. This infamous voyage focused attention on a growing problem, the management of municipal solid waste (primarily from residences, businesses, and institutions). Currently, 85 percent of municipal solid waste is sent to landfills. Some landfills, however, have been closed, and many more will reach full capacity during the next decade. Developing new landfills has been difficult because of lack of available land, environmental risks, public opposition, rising disposal costs, and increasing regulation.

Municipalities are considering other options, particularly incineration and recycling. Public opposition to incineration has increased, however, because of concerns about costs and health risks. Some people contend that it should only be used after reduction and recyling programs are fully implemented. High rates of recycling, however, have not been achieved on a widespread scale, and little effort has been devoted to waste reduction, particularly how to remove those pollutants or products that can cause harm when incinerated or landfilled.

OTA will evaluate how different technologies for reducing and managing municipal solid waste can be used in an environmentally and cost-effective long-term strategy. The assessment will consist of seven tasks: 1) composition and amounts of municipal solid waste; 2) opportunities for waste reduction (i.e., reducing generation of municipal solid waste or eliminating harmful pollutants from its components; 3) technologies and capacities for recycling, incineration, and landfilling; 4) economics of different options; 5) Federal, State, and municipal programs; 6) international experiences; and 7) the future of municipal solid waste policies (policy options).

Project Director: Howard Levenson 228-6856.

Estimated publication date: Spring 1989.

Requested by: Senate Committee on Environment and Public Works
House Committee on Energy and Commerce
House Committee on Science, Space, and Technology

Selected Completed Publications *Summary available

Acid Rain and Transported Air Pollutants: Implications for Public Policy (R)—6/84.*
Project Director: Bob Friedman 228-6855.

The Border War on Drugs (R)—3/87.
Project Director: Peter Johnson 228-6862.

Marine Minerals: Exploring Our New Ocean Frontier (R)—7/87.
Project Director: James Curlin 228-6861.

Ocean Incineration: Its Role in Managing Hazardous Waste (R)—8/86.*
Project Director: Howard Levenson 228-6856.

Oil and Gas Technologies for the Arctic and Deepwater (R)—5/85.*
Project Director: James Curlin 228-6861.

Protecting the Nation's Groundwater From Contamination (R)—10/84.*
Key Contact: Bob Niblock 228-6850.

Wastes in Marine Environments (R)—4/87.*
Project Director: Howard Levenson 228-6856.

Science, Education, & Transportation (228-6920)

Sustaining the National Technological Base: Education and Employment of Scientists and Engineers (R)

This study will identify and analyze factors affecting the education and employment of scientists and engineers over the next two decades. The objective of this analysis is to describe the dynamic interactions between public policies, private actions, and the Nation's changing research work force.

The first phase of the study will review supply and demand data for individual scientific and engineering disciplines. Key trends and factors shaping supply and demand for scientific and engineering disciplines will be identified. These factors will be analyzed in detail in the second part of the study. This analysis will focus on the education "pipeline" from precollege through early career; on the institutions that recruit, channel, and certify students in science and engineering; and on academic and industrial needs for faculty and researchers, which dominate demand for scientists and engineers.

Project Director: Daryl Chubin 228-6933.

Estimated publication date: Spring 1988; interim deliverable, Winter 1986.

Requested by: House Committee on Science and Technology

Educational Technology: An Assessment of Practice and Potential (R)

The use of microcomputers in elementary and secondary education has grown dramatically; there are now more than 1 million computers in over 85 percent of American public and private schools. In many cases, computer-based systems are coupled with advanced telecommunications and video technologies. These systems have the potential to deliver instruction, reinforce basic skills, overcome physical and linguistic handicaps to learning, and enhance educational program effectiveness. OTA will analyze the wide range of instructional technologies in American schools.

The study will focus on several factors that influence effective implementation of the technology. These factors include federally funded programs for educationally and economically disadvantaged children, various approaches to teacher training, incentives and/or barriers to development of appropriate software, State, local, and private sector initiatives, and research and development. The study will review policy options designed to maximize uses of educational technologies toward the goals of improved learning and preparation for productive futures.

Project Director: Linda Roberts 228-6936

Estimated publication date: Spring 1988

Requested by: House Committee on Education and Labor, and its Subcommittee on Select Education

Endorsed by: Senate Committee on Commerce, Science, and Transportation

Safety in the Commercial Aviation and Motor Carrier Industries (R)

Over the past 8 years, the commercial aviation and motor carrier industries have restructured. The increased number of carriers and freedom to set rates have brought intense competitive pressures to keep costs down. The study will examine whether transportation safety is being maintained at an appropriate level within the new industry structures. Questions to be addressed are:

- What new or existing technologies can be utilized to improve safety?
- Is sufficient safety data available and is that information analyzed in an appropriate manner?
- Are Federal safety standards appropriate, and are these standards being adequately enforced?

The OTA study will analyze aviation and truck safety separately, but simultaneously, and will result in two final reports, one for each of the two modes.

Project Director: Edith Page 228-6939

Estimated publication date: Interim publications:
"Safety in the Commercial Aviation Industry" (R), Spring 1988;
"Safety in the Commercial Motor Carrier Industry" (R), Summer 1988.

Requested by: House Committee on Government Operations, Subcommittee on Government Activities and Transportation
House Committee on Public Works

Selected Completed Publications

*Summary available

Civilian Space Stations and the U.S. Future in Space (R)—11/84.*
Key Contact: Nancy Naismith 228-6920.
Interim publication:
"Salyut: Soviet Steps Toward Permanent Human Presence in Space" (TM)—12/83.

Science Policy Projects:

Demographic Trends and the Scientific and Engineering Work Force (TM)—4/86.
The Regulatory Environment for Science (TM)—4/86.
Research Funding As An Investment: Can We Measure the Returns? (TM)—4/86.
Key Contact: Nancy Naismith 228-6920.

Technology, Innovation, and Regional Economic Development (R)—7/84.
Key Contact: Nancy Naismith 228-6920.
Interim publications:
"Census of State Government Initiatives for High-Technology Industrial Development" (BP)—5/83.
"Encouraging High-Technology Development" (BP)—2/84.

Transportation of Hazardous Materials (R)—7/86.*
Project Director: Edith Page 228-6939.
Interim publication:
"Transportation of Hazardous Materials: State and Local Activities" (SR), published 2/86.

General Information

Contacts Within OTA

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List of Publications.—Catalogs by subject area all of OTA's published reports with instructions on how to order them.

Report Briefs.—One-page summaries of OTA reports.

Summaries of OTA Reports.—The summaries of most OTA reports published since late 1979 are available, at no cost, as separate booklets.

OTA Annual Report.—Details OTA's activities and summarizes reports published during the preceding fiscal year.

OTA Brochure.—"What OTA Is, What OTA Does, How OTA Works."

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